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Nota di contenuto	Preface to the second edition -- Preface to the reissue of the Materials characterization series -- Preface to series -- Preface to the reissue of Characterization of tribological materials -- Preface -- Acronyms -- Contributors -- [1.] Introduction --

[2.] The role of adhesion in wear -- 2.1 Introduction -- 2.2 Considerations for experiments -- Background -- Macroscopic experiments -- Atomic level experiments -- Microscopic contacts -- 2.3 Theoretical considerations at the atomic level -- Background for theory -- Universal binding energy relation -- Semiempirical methods -- 2.4 Conclusions -- References --
[3.] Friction -- 3.1 Introduction -- 3.2 Sliding friction -- Basic concepts -- The dual nature of frictional process -- Phenomenology of friction process -- Real area of contact -- Adhesion component of friction -- The interface shear stress -- Deformation component of friction -- Viscoelastic component of friction -- Friction under boundary lubrication conditions -- Phenomena associated with friction -- 3.3 Rolling friction -- Review of rolling friction hypotheses -- Free rolling -- 3.4 Exceptional friction processes -- 3.5 Conclusions -- References --
[4.] Adhesive wear -- 4.1 Introduction -- 4.2 Surface analysis -- 4.3 Auger analysis of worn surfaces after "unlubricated wear" -- 4.4 In situ systems -- 4.5 Conclusions -- References --
[5.] Abrasive wear -- 5.1 Abrasive asperities and grooves -- 5.2 Yield criterion of an abrasive asperity -- Abrasive wear mode diagram -- 5.3 Degree of wear at one abrasive groove -- 5.4 Macroscopic wear in multiple abrasive sliding contacts -- References --
[6.] Boundary lubrication -- 6.1 Introduction -- 6.2 Mechanical effects in lubrication -- 6.3 Adequacy of hydrodynamic fluid films -- 6.4 Chemical effects in liquid lubrication, boundary lubrication -- 6.5 Wear and failure -- 6.6 Research in boundary lubrication -- 6.7 Laboratory research -- 6.8 Composition of films -- 6.9 Further mechanical effects of the boundary lubricant layer -- 6.10 Surface analysis of boundary lubricated metals -- 6.11 Ellipsometry and its use in measuring film thickness -- References --
[7.] Magnetic recording surfaces -- 7.1 Introduction -- 7.2 Magnetic storage systems -- 7.3 Wear mechanisms -- Head-(particulate) tape interface -- Head-(particulate) rigid disk interface -- Head-(thin-film) rigid disk interface -- 7.4 Lubrication mechanisms -- Measurement of localized lubricant film thickness -- Lubricant-disk surface interactions -- Lubricant degradation -- References --
[8.] Surface analysis of precision ball bearings -- 8.1 Introduction -- 8.2 Disassembly -- Examination, optical microscopy, and photography -- Gas analysis by mass spectrometry -- Lubricant analysis and removal -- 8.3 Microexamination -- Scanning electron microscopy -- Profilometry -- 8.4 Surface analysis -- Auger electron spectroscopy -- Photoelectron spectroscopy -- SIMS -- Vibrational spectroscopy -- 8.5 Future directions -- Acknowledgments -- References --
[9.] Atomic force microscope nanofriction -- 9.1 Introduction -- 9.2 Description -- 9.3 Friction measurements -- 9.4 Uses -- 9.5 Kelvin probe application -- References --
Appendices: technique summaries -- Light microscopy -- Scanning electron microscopy (SEM) -- In situ wear device for the scanning electron microscope -- Scanning tunneling microscopy and scanning force microscopy (STM and SFM) -- Transmission electron microscopy (TEM) -- Energy-dispersive x-ray spectroscopy (EDS) -- Scanning transmission electron microscopy (STEM) -- Electron probe x-ray microanalysis (EPMA) -- X-ray diffraction (XRD) -- Low-energy electron diffraction (LEED) -- X-ray photoelectron spectroscopy (XPS) -- Auger electron spectroscopy (AES) -- Fourier transform infrared spectroscopy (FTIR) -- Raman spectroscopy -- Rutherford backscattering spectrometry (RBS) -- Static secondary ion mass spectrometry (static SIMS) -- Surface roughness: measurement, formation by sputtering, impact on depth profiling -- Index.

Sommario/riassunto

Tribology is a discipline concerned with contacting surfaces. This book shows how surface analytical techniques can be used together with the knowledge of basic principles of tribology to help understand failure processes. For instance, Chapter 8 shows how precision ball bearings and their critical lubrication requirements require knowledge of lubricant behavior of very thin films and surface reaction (boundary lubrication) for reliable performance. Thus if a bearing material is altered, it may be necessary to determine its effect on surface chemistry of lubricants. Surface analysis, including wear scar analysis, can be factored into test programs as a supplemental component or as an integral part of the set up.